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(54) **MEDICAL RADIOISOTOPES AND METHODS FOR PRODUCING THE SAME**

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(58) **Field of Classification Search** 423/249; 376/156, 157, 186, 190, 191, 196, 201; 250/430
See application file for complete search history.

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(57) **ABSTRACT**

This disclosure concerns a new method for preparing radioisotopes, such as molybdenum-99, by alpha particle irradiation, such as by alpha particle irradiation of zirconium-96. Molybdenum-99 is a precursor to the medically-significant radioisotope technetium-99m. Also disclosed are novel compositions containing one or more of technetium-99m, molybdenum-99 and zirconium species. Systems for producing molybdenum-99 and technetium-99m, including alpha particle generators and irradiation targets, also are described.

37 Claims, 5 Drawing Sheets